

AVIATION WEEK

OCT. 15, 1951

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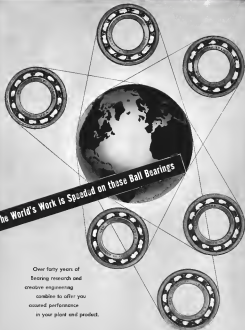
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AVIATION WEEK October 11, 1991

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WHO'S WHERE

In the Front Office

Alvin F. Adams has been named a vice president of Pan American World Airways, assuming duties and responsibilities of John H. Tamm, who is due to reach retirement age shortly. Adams formerly headed its new aviation management consulting firm, previously was president of Western Air Express, now Western Air Lines.

Arnold K. Brown has been appointed president and director of Transalloy Corp. of Boston, successor subsidiary of American Machine & Foundry Co. The new post will be supplementary to his duties as executive vice president of the parent firm. Brown formerly was vice president of Boeing & Shipley.

John A. Callings has been designated executive vice president of Trans World Air line and will continue his new duties with his position as vice president-operations, which he has held since 1942. In other top level TWA posts Gordon L. Gilman, who has been with the carrier since 1946, has been made vice president-public relations and David W. Sherr, with TWA since 1947, has been elected vice president-civil aviation.

Changes

A. B. Boole, formerly with Aerojet, has been appointed assistant administrator of General's Control Missile division. Claude M. Manning has been named manager of the Alcoa's Manufacturing Co. of Los Angeles, also assuming his other post as director of the General Corp. of Los Angeles.

Thomas H. Clark, formerly of Federal Telecommunications Laboratories, has been designated director of Southwest Research Institute's division of military research and development.

Don Young has been named senior manager for Aerojet's development of General Motors. E. J. Goodrich succeeds the late W. J. Walker as general manager of Eaton Manufacturing Co.'s Springfield, E. H. Lindstrom has been named general manager to charge of Lord Sprague and H. H. Clark has been promoted to assistant general manager in charge of Carl Sprague.

Glen R. Warren has been appointed general manager of General Electric's new turbine division as part of a move by GE forming six new operating divisions including the majority of the departments which constituted the former Large Apparatus and Small Apparatus divisions. James M. Crawford is the new general manager of the Motor and Generator division. Francis E. Farnham, Jr., has been named general manager of the Transformer and Alad Products divisions. George E. Brown is general manager of the Switchgear and Control divisions. Donald E. Shure has been designated general manager of the Measurements and Instrumental Products division and William C. Wickham has been appointed general manager of the Computer Products division.

INDUSTRY OBSERVER

The week's column was written by Associate Writer engineering writer David A. Anderson from observations at the Society of British Aircraft Constructors' twentieth annual show at Farnborough, England.

■ Most widely known secret in British aviation circles is announcement of new jet fighters such as Hawker P.3807 and Supermarine 500—a competitor of T-10s, recently developed from the wartime Gloster MK (for Meteor-known) 488. Major improvement in the aircraft has been in increased rate of fire.

■ Hint of failure stood as open in constant modification of concepts for Valiant Supermarine Atlantic, first jet fighters in squadron service with the Royal Navy. Modification changes all clear, double-thrust subsonic design to a small powered outboard with after burn of dual.

■ Progress on British 175 turbo-prop jet (the Britannia) points toward a single dose of late 1952. Extreme arrangement of the craft, which is roughly the size of the Stratocruiser but with less capacity, has yet to be finalized.

■ The Aero Ashton, high altitude flying test bed, was shown at Farnborough with a section of the cabin completely fitted with seats and accessories for testing passenger comfort at different pressure levels.

■ Continued British interest in flexible ducts and turbo-propulsion engines for naval aircraft was highlighted by the rubber cut landing at a de Havilland Sea Vampire one morning of the SBAC display. After two runs, the Vampire landed on the duct and dropped to the rubber mat heavily. Disorientation was reported as VG, but looked like much more.

■ De Havilland Comet, Ghost-powered, is scheduled to go into service on the London-Glasgow route for BOAC, stopping at Gair, Edinburgh and Liverpool. Later Aero-powered Comet will be able to make the same run with only stop at Glasgow.

■ Airport Aerobus, just recently on trial passenger service between London and Paris for British European Airways, has been transferred to carrying freight. Since Aerobus is not designed as a freighter, specifications for the shift to task in transporting and maintaining systems have been somewhat. On early flights, passengers unseated in tropical atmosphere of 85-deg. temperature.

■ Bristol Sycamore helicopter, single rotor, 4.5 passenger jobs, have been awarded temporary proving clearance at ditch landing. Commanding also development of Bristol 175 five-engine rotor which uses Sycamore rotor blades.

■ The Marcel Dassault Mystere, surprising prototype French fighter, has been flown at speeds very close to sound. Curiously powered by a Hispano-Suiza 12N, the Mystere is slated to replace the P-51 in the 801 aircraft of increased thrust. Informal sources say that the Mystere will reach supersonic speed with the new engine.

■ The Sud Ouest 4003, French twin jet bomber of promising design, is slated to complete early stages of flight before because of lack of funds for operations. Prospects are that the plane will be in the air again after January, which date will mark the beginning of the next French lead year.

■ Estimates of Red air force strength in Europe vary from the value of 1,000 types by Air Force Headquarters, British Secretariat of State for Air, to a French air force estimate of 15,000 to 18,000. This figure is reported as factual aircraft only, does not include any of the bomber bases situated in Russia.

140-Wing USAF?

First boost to USAF's build up to 140 wings by 1954 seen as up left within the Administration.

Joint Chiefs of Staff have approved the expansion beyond the present target of 95 fully manned wings by late next year.

The proposal is now before the Security Council, dominated by the heads of civilian departments and agencies.

The Council's members could see its cost—and the larger the extra spending must play on the economy. It would show the current fiscal year ceiling for USAF down to the \$300-billion mark, the total defense bill up to \$70 billion—over five times the \$13 billion spent two years ago.

Rep. George Mahon, chairman of the defense appropriations subcommittee, seconded a speech in the House.

"Before approval can be given the wisest consideration, it is necessary to consider whether or not military and labor can provide the materials . . . There are also very grave fiscal considerations which must be weighed carefully . . . before decision is reached on the magnitude of the new air power program."

Considerable concern is indicated to continue in getting "pure" stock of "batteries" are new intelligence reports of the mounting of greater enemy air power in the Korean theater.

Last week, though, the Administration wouldn't even say "maybe" to air power expansion.

- Congress was set to vote a \$5 billion "national race gray fund" to "broaden the base" for a building of Naval air and USAF beyond the present goal of a 14-center Naval force and a 72-wing USAF and to provide funds to let contacts at the time of the war to keep the two arms separated at the present target strength with up-to-date aircraft after mid-1955. Defense Secretary Robert Lovett recommended the \$5 billion. He explained that it wouldn't be a commitment to begin in 1955 but would be a commitment to begin in 1955. The Senate voted the House was ready to go along.
- But the President will not.

• The extreme Congress voted \$5 billion additional for plane buying agency. \$667 million for USAF \$175 million for Navy. A big step for air expansion, especially since it would now require heavy loss from the production that which is required for airplanes or even engines.

• This seems no time will be lost in the building up of air power—the President only in the year gets the green light to the 140-wing program and the some \$6 or \$7 billion additional early USAF will need to replace what it. The services wouldn't have obligated the \$5 billion before January even if that amount had been voted then.

USAF: The Major Defense Arm

Meanwhile, the Air Force, only four years an independent service, is now the major arm of defense. The current 1952 fiscal year military budget as approved by Congress divides the funds USAF, \$18.6 billion, Army \$19.5 billion, Navy, \$15.4 billion.

It will take about two years to transfer the funds into strength, in being.

Vandenberg vs. Fechteler

USAF's Chief of Staff, Gen. Hoyt Vandenberg, and new Chief of Naval Operations, Adm. William F. Fechteler, have different ideas on the role of the last soldier in a coming war.

Fechteler expects the dogfight to hold the key to victory. Vandenberg believes total aviation, equipped with "buddy" bombs, holding out the promise of victory for relatively out-manned allied ground troops.

• Fechteler's viewpoint: "Neither the great improvement of the past nor those of the foreseeable future will alter the basic military truth that of arms are available to the last soldier. 'The man who rolls on the ground' remains and will remain the controlling factor in facing an enemy to do our will. His arms will remain basically what they are today. The support he needs will be provided with devices beyond what we have."

• Vandenberg's outlook: "We stand on the threshold of atomic and intercontinental developments. If it was a truism before to say that air power armed with conventional weapons held the key to the ground battle, it can now be predicted with reasonable confidence that air power plus atomic armed with atomic weapons may, through the precision bombing of installation points, prevent the meeting of the large aggregations that brought on the bloody slaughter of the past."

Boyle Aviation Accounts

The law broken sold by Democratic National Committee's Chairman, William Boyle to his partner, Sam Seidman for \$150,000, when Boyle charged his status from unpaid to paid executive vice chairman of Detroit National Convention only in 1949 method (according to Seidman's report).

• United Air Lines, Valuation, managed by Boyle and Seidman \$93,000. The account involved controversy with War Assets Administration over being embezzled for part of the Kansas Tusk plan in Chicago. The outcome: A settlement was signed with War Assets Administration local of the WAA legal staff, now Defense Material Administration, but only \$15,000 in fee referred Tom Davis, now Assistant Secretary of Commerce, was United's Washington representative at the time the account was handled by Boyle.

• Trans-Columbia Airlines, Valuation, \$1,000. The account involved a dispute with WAA over supplies planes. The outcome: Settled to the company's satisfaction and \$1,000 fee collected.

Things to Watch For

• No more regular flight pay for pilots assigned to desk jobs—just intermittent pay for intermittent flying without to maintain proficiency.

The new law provides no pay to personnel "whose actual assigned duties do not involve operational or training flights." Its congressional authors passed on this fiscal obligation of the law's intent. "To make certain that officers and sergeants shall not be permitted to draw flight pay except for flights on specific orders for operational or training flights, including such flights as are necessary to maintain the proficiency of administrative personnel." They estimate a saving of \$130 million annually.

—Katherine Johnson

Unrealistic Aircraft Schedules Face Cuts

Planners take new look at engine production and find they have more planes coming than engines.

And, anyway, if present schedules are met, civilian production would really feel the pinch.

So military schedules will be keyed to the engine output, but civil aircraft will take big slash.

By Alexander MacGowan

New aircraft schedules for U. S. military aircraft production, based on a new approach of how many manufacturers can actually be supplied for the airplanes, are due for announcement in less than two weeks.

Washington aviation circles were humming last week with reports of the extent of the expected deficits in schedules, and what plans and power plants they would allow.

Anonymous White House sources said the revised engine schedules had already been determined for the first quarter, 1952, and that revised aircraft schedules would be the engines available, would be so concerned to airplane manufacturers thereby.

• Pratt & Whitney-Two major jet engine producers, Allison and General Electric, were reported to be working on schedules, but better than most of their competitors. Sikorsky have seriously interfered with production at Curtiss-Wright Pratt & Whitney Aircraft has not been able to keep pace with the number in production scheduled for it as a result of its strike situation, although it is still maintaining a good production rate on both jet and piston engines.

Washington Aviation Co. Engine division is reportedly behind schedule due at least partially to the effect of the Kansas City floods on its jet engine plant there. The new Washington 146 is also reported behind schedule, to the extent that other makers of engines may have flown in some of the new Navy fighters which were scheduled to be powered by that engine.

As previously reported in *American Week's* roundup story on forthcoming automotive production, (Sept. 24, 1951 issue) there will be no substantial loss from the automobile manufacturers' jet engine program for many months.

Not much of the engine picture means that present military aircraft pro-

duction schedules in many cases are not realistic, the Office of Defense Mobilization and the Defense Department have decided.

A close look is in the way to cut schedules to an "achievable" level as the heavy program on the Defense Production Administration from the civilian industries which are more and more feeling the pinch of materials restrictions in military production starts to grow.

• Where the Air Falls—Where will the cuts in engine schedules hit? The Defense Department is trying to decide that question right now. But the first schedule for the first quarter only is to study the types of engines which power the various aircraft.

It looks as if airplanes powered by the Pratt & Whitney J35s and J37s and the General Electric J45s and possibly the Pratt & Whitney J48s which are coming out in fairly good numbers, will not suffer. As a matter of fact, USAF wants to accelerate schedules for such planes as the North American F-86, Lockheed F-94, Northrop F-89, Boeing B-47 and Convair B-56, all of which use some of these engines, as rapidly as is possible.

Curtiss-Wright's piston engines as

well as those jets are reported falling behind on production due to the strike. So airplanes using the Wright R-3350s and similar Wright piston engines may experience schedule reductions as well.

At least one of the engine manufacturers (Allison) ran into an attempt to cut back some of its materials requirements at Defense Production Administration. The attempt cut was stopped by appeal, but it again raised the question of how far the new "open season" on military aircraft requirements can be carried in an effort to take care of civilian industry materials requirements.

• May Not Be So Bad—Initial estimates of engine schedules will not be nearly as drastic as industry fears. But the fact remains that schedules originally called for are going to be cut, and some of them sharply.

Whether the decision to stop making schedules had any connection with the resignation of John A. McCaskey USAF Undersecretary, as a question being asked around Washington, McCaskey had seemed considerable personal responsibility for the schedule cuts now being dropped, and felt that the industry would be able to catch up and meet them in most cases. It is not believed that he looked with any favor on the proposed cutbacks at the present schedule he had followed.

The cutbacks have been listed at reportedly in some specifics of Mundy Planchette, USAF Administrator and Defense Mobilization Chief E. Wilson, who have made references to "a complete viewpoint on production schedule" and to have that the engine production can only be cut so far, and still kept alive.

DPA Moves Against Civil Aircraft Makers

Defense Production Administration has ordered cuts of 11 to 19% in materials for civil aircraft production and military aircraft production materials that reported in *Aviation Week* Oct. 8, p. 70.

Outlook now is for an last-ditch fight in the DPA Pressure Adjustment Committee, with odds, listed against military aircraft production materials, but reported in *Aviation Week* Oct. 8, p. 70.

So the top jobs must an experience

of civil transport is mobilization is still a building.

DPA staff is theories in making the 11 to 19% cuts in first-quarter annual allocations.

• Civil transport and other aircraft are essential enough to exempt heavy cuts in the shortage orders passed about DPA's belief.

• Civil aircraft allocations requested by NPA Aircraft Division are reportedly higher than other estimates of their requirements submitted by the Civil Aeronautics Administration's Aviation

Defense Requirements Office, DPA says, are not as much lower than NDA's, since DPA will take an even lower figure and set how it will be met.

DPA is not to stop "inventory building" by itself companies' stock and manufacturers. So it does the companies' makers' estimates of requirements, too, as well as the civil aviation acquisition. Since 95% of the aircraft from programs designated "D products" under NPA authorities are for military planes.

Military needs override civil for source materials, DPA says. So the cuts previously reported will be mostly taken out of civil aircraft requirements. That is the DPA plan. Some of the cuts, however, will be passed on to military companies. This is "as set to stop all civil aircraft support." Military requests are on the same schedule as civil, and will be shared only by DPA's action.

Gilpatrick Succeeds McCone in AF Post

Resignation of John A. McCone as Undersecretary of Air Force and succession of Russell L. Gilpatrick is assured him here, being announced by President Truman.

McCone is returning to Los Angeles to reenter private business. The 45-year-old Gilpatrick, former New York attorney, has been serving as Assistant Secretary of Air Force since April, with the assignment of formulating and supervising procurement policies of the USAF.

"Magna Carta"—McCone's departure heads up the issue which last week was opened in the President's Air Policy Commission in 1947 and 1948. Thomas Knight Fawcett, chairman of the commission and McCone, as one of its members, were generally critical with the major role in shaping the commission's report, since generally regarded as a kind of Magna Carta for air power.

When Fawcett was named Air Force Secretary in April, 1958, he promptly asked McCone to be undersecretary.

First Line—McCone took over the task of supervising the rebuilding of the U. S. aircraft industry for military plane production to support the USAF in the future's long line of defense. Tip off to the fact that McCone has been passing to Gilpatrick his job was the morning responsibility for procurement has been going to Gilpatrick in recent months.

Gilpatrick was born in Brooklyn and graduated from Yale University Law School in 1931. Admitted to the bar in 1932, he became a member of the law firm of Corbett, Senter and Wood.

• **Contract Experts**—During World War II, Gilpatrick was critical for corporations in war production and was recognized chiefly for the legal aspects of military dealing with the time of emergency plant facilities, and aircraft plans and contract transaction procedures.

McCone is returning to Los Angeles as chairman of the board of both the Pacific Hardware Corp. and the Pacific First Trust Inc. In 1937, McCone, a former member of Consolidated Steel, formed the Bechtel-McCone-Perrine Corp., Los Angeles, to engage in design, engineering and construction of power plants, refineries and power plants.

Probers Eye AMC Procurement

Gen. Rawlings demands internal soul-searching as gratuity charges result in several resignations.

Dayton, Ohio—An Air Materiel Command announcement that several key personnel had resigned as a result of numerous investigations and demands for further investigations and demands of others who might have violated regulations.

An Air Force spokesman said contacts involved amounted to millions of dollars, but there was no smoking indication of the scope of the alleged violations.

Extent of demands resulting from alleged violations of procurement regulations will depend completely on the range of potential investigations.

If the probes drive down to the "high level" end of the level — and such "gratification" are issued by AMC regulations—the lowest end will be the lowest end of the level.

If, however, the probing reaches actual major irregularities such as reported in two recent announcements by AMC, the demand could be to the top.

That is the general consensus here in fact.

• **Unexplained resignation**—resignations headed by Sen. Erma Kolbe, after the Senate adjourned, and

• **An internal soul-searching** by AMC as demanded by Lt. Gen. Z. W. Rawlings, newly-appointed commanding general.

Evidence in the cases that far as anything has been heard over to the Department of Justice for possible prosecution.

• **Unexplained resignation**—resignations of several individuals involved in the demand to creating a hostile position within the Procurement division, shaped with growing apprehension 516 billion worth of contracts during the current fiscal year.

The current wave of demands and "discovery" investigations—driven from a regulation which provides buyers may not accept gratuities from contractors, present or potential. "Gratification" are defined as favors from contractors or their representatives and may range from actual cash gifts down through lunches, entertainment and hotel accommodations.

While at least one of the seven cases brought to light currently involve an employee in the Wright Air Development Command, it has been named only to AMC for investigation because it pertains to procurement which is under AMC.

• **AF View**—In a prepared statement, a former member of Consolidated Steel, formed the Bechtel-McCone-Perrine Corp., Los Angeles, to engage in design, engineering and construction of power plants, refineries and power plants.

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which he named, Gen. Rawlings declined.

"We in the Air Force have a sacred obligation to build up the defenses of the United States as quickly and safely as possible. Any man or woman who violates the standards of the Air Force, and then hides or misrepresents programs, will be questioned first by his Air Force connections immediately."

"The Air Force has high rates against military personnel, or civilians employed by the military, accepting gifts, gratuities or performing their duties in any improper manner."

"However, in any operation involving thousands of people and billions of dollars, a very small, but not minor, activity by any means. I have authorized everyone in my command to be as a usual lookout for such individuals. Our system of detecting and preventing misconduct is good and we are constantly seeking to improve it. But no matter how perfect our checks may be, some offenses may go undetected for a short time."

"We have upgraded several civilian positions lately for irregularities. Several others have resigned when they knew they were under investigation. Their numbers are infinitesimal when compared to the thousands of people in the command who are doing as honest, modern and efficient jobs for their country. Thank God, we have so many of these latter."

Among the cases cited in the statement which was noted by the general are:

• **Discipline**—One civilian who admitted discrepancies in dealings with a contractor.

• **Supervision**—One civilian for six months and transfer to another job outside procurement for the same reason.

• **Resignation**—A buyer of several equipment who admitted receiving gratuities, a buyer of electronic equipment who admitted making specifications changes to favor bidding, to a favored firm to a supervisor who admitted accepting gifts and assigned the next day to accept employment with an old line contractor.

Others include one instance in which a contractor had a contract canceled because of erroneous statements by his representative.

All representatives' representatives are cautioned to sign a statement that they will not offer gifts to Air Force personnel.

Failure to do so could lead to harassment of the representative in question from the Air Force.

Violation of official terms makes possible cancellation of the contract with the buyer involved, certain other penalties and having the representative from the Air Force.

New Aviation Engine Plant for Chevrolet

Chevrolet division of General Motors moved still farther into the aircraft engine production progress last week with announcement of plans to build a new aviation engine plant with 1 million sq ft capacity at Flint, Mich., for production of parts and subassemblies of Wright R-3350 engines.

Plans will be completed at the Chevrolet-Townsend, N. Y. plant site, which approximately 3 million sq ft of additional plant area is being assigned to the project. Seven other Chevrolet plants already have received production assignments for components of the engine and additional assignments are planned.

Construction of the Flint plant and of a midsize jet, it addition to the Townsend plant are due for completion in about a year.

Chevrolet will build both the Wright

R-3350 24-cylinder piston engine rated at 2700 hp, and the R-3350-40W compound turbo-piston engine, rated at 3160 hp, under contract for the Air Force and the Navy.

Stepping up of the Chevrolet plant capacity for the R-3350 production indicates a still larger emphasis on the big engine, which powers such planes as the F-86H G-1A, Lockheed F-2V and the Douglas AD-1. The Chevrolet R-3350 production will be in addition to that already underway at the Wright Aeronautical Corp., engine developer of the engine, at Wood Ridge, N. J.

USAF Appointment

Reg. Gen. Ralph P. Sanford, Jr., has been appointed (reassigned) USAF's Institute of Technology at Wright-Patterson AFB, replacing Reg. Gen. Leighton L. Davis who will become chief of research, Air Research and Development Command, at Dayton, Md.



BUCKAROO WITH A KICK

Yankee's new T-35 Buckaroo bomber, weighing only 10,750 lb, fully loaded, carries 10,000 lb. of bombs. 20-Mph. machine guns with 100 rounds of ammunition each, cir-

cles with 15-in. 15-mm. gun cannons. Speed range is 533 knots. Its combined nose light advantage for action with high speed jet strafing and target marking guns.



RUSSIAN MIG-17 shows support and reconnaissance aircraft captured in Korea as shown shipped down outside the AFSC building at Wright Patterson AFB where it will undergo close study by experts.



WING SECTION of a YAK-11 shot down over Korea is inspected. Although only a minor gas engine was provided in photo.



UNIFORMS of North Korean and Communist Chinese also are being given close inspection. Top is GI inspect.



ARMAMENT recovered from Russian IL-16 by AFSC included the 7.62 Yakovlev on top left and the 23 mm Vya, below. One of each model is mounted in either wing of the two-center support aircraft.

AF Studies Captured Russian Equipment

Detroit, G-M—More effective fire power in the dominating fighter in United Nations armament in air battles against Russian-built fighters over Korea.

That's a logical conclusion after analysis of equipment captured in Korea and flown to Wright Patterson AFB for detailed analysis by experts operating under direction of Air Technical Intelligence Center.

Some cases of AFSC operations in Building 68 at the Air Force base and it is here that military aircraft component specialists derive data performance of captured equipment to make their evaluations which, in turn, are

matched against capabilities of our aerial equipment.

Cautiously-studied visitors won't find complete enemy aircraft on the premises. Rather, they find major units in bits and pieces of enemy aircraft which are being subjected to exhaustive testing to ascertain strong and weak points.

Take the IL-16, for instance. It is a Russian two-seater close support and reconnaissance plane salvaged in Korea and the source of much interesting information on the trends taken by Russian aircraft designers. It carries two Vya 23 mm guns, one in each wing and a smaller Shkval 7.62 mm gun in each wing. The former is a bit heavier

than our .50 caliber machine gun—but provides more rate of fire power.

The rear gunner in this two-seater also has a 12.7 mm machine gun mounted in the rear turret.

A MIG-15, the YAK-11 are among the heaviest tons of captured enemy equipment sent to AFSC from Korea. Major assemblies are taken apart to see what makes them tick by specialists under the direction of Col. Harold E. Watson, the chief.

Col. Watson and his staff are about on their knees. But the results of these tests are passed along to industry and, where applicable, to our tactical forces.

"Up, Please"

TODAY'S JET PILOTS merely flick a switch to move up or down in the cockpit. Hand-cranking elevators some seconds... had to be washed out of jet aircraft.

GILFILLAN'S JOB was to produce fast a push-button elevator to raise and lower the pilot seat for Lockheed's F-94 All-Weather Interceptors and T-32 Two-Place Jets.

IMPORTANT Vital? Safe landing and taking, accurate gun-firing, easy reach of controls and instruments depend on pilot position. Jet speeds and complex cockpits demand quick, easy seat adjustment.

Gilfillan developed and designed a pilot seat elevator to "impossible" specifications in record time. Weight: 7 lbs. Performance: Lift 350 lbs. 5 inches in 3 seconds, operate at 12 below zero.

TODAY, Gilfillan is mass-producing pilot elevators in jet time. Now thinking for new problems in R & D, at Gilfillan. For forty years Gilfillan has been following through from "impossible" developments to mass production.

This type of thinking backed by proven results makes Gilfillan, pioneer of GCA Radar Landing Systems, a production leader in precision electronics and aircraft equipment.



GILFILLAN'S push-button pilot seat elevators are now being installed on Lockheed's F-94 All-Weather Interceptors and T-32 Two-Place Jet Trainers.

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"The Well Tempered Aircraft"

Under that title, Arthur E. Raymond, vice president-engineering, Douglas Aircraft Co., delivered the 1946 Walter Wright Memorial Lecture before the Royal Aeronautical Society in London Sept. 10. Because of Raymond's leadership among engineers (which has brought him, among other honors, membership on the National Advisory Committee for Aeronautics), this lecture may reflect the self-realization going on in the engineering fraternity at this time of great change in aeronautics. It is also the most thorough approach to the problems of constructing today's aircraft made by a recognized authority in aircraft assembly. Arts again. We are therefore publishing it, and subsequent parts in the series.



Arthur E. Raymond

Eight "Musts" for Production

- It's not very difficult to build an airplane—even a radical airplane—and make it fly. But it's not a successful airplane unless there's a need for it.
- And after the need is determined and met, there is still another factor: the well-tempered aircraft has both quality and suitability of design.

- The task today in the field of aircraft design is to produce a large number of good aircraft with the least expenditure of cost and time. The resources of Great Britain and the United States are limited and must be used as effectively as possible. By good aircraft are meant aircraft that contribute more to society than they cost. Such aircraft normally have long production lives. They also have what might be called "design excellence," something that can only result from proper blending of scientific, impartial technical analysis with judgment and common sense, the same practical approach used by the Wright Brothers 45 years ago.
- In attacking this subject certain fundamental elements are listed. These may not be all inclusive, but they appear to be essential to the production of experimentally tested aircraft.
- A proper environment—the work should be carried on in an atmosphere conducive to efficiency.
- Good initial choice, based on sound specifications.
- Excellence of detail design.
- Thorough development—the "debugging" process.
- Follow through—modernization and maintenance of operating personnel.
- Thorough exploitation—the existence of the aircraft must be made known to those who have a need for it and all the uses in which it may be used must be explored.
- Convert experience—properly timed introduction of a new model.
- Adapt capacity—ability to cope with the unexpected.
- These fundamental elements are now considered in turn.

1. Proper Environment

Confidence—The thing above all else that makes a project go is the enthusiasm of its leaders, not false enthusiasm put on for effect—now or later that is

seen through—but rather the enthusiasm that comes from the conviction that the project is sound, worthwhile, and due to succeed.

This is a point which situation must be made open to the Wright Brothers. Confidence and the courage that results from it are fundamental and essential.

Adequate Financing—Confidence must be translated in others, and among the first who must be convinced are those who put money into the project. Whether this backing is from the government, a private, or a combination of both, it must be adequate to carry through the inevitable times of discouragement.

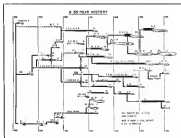
It is often easier to build a prototype than it is to put it into production. There are many reasons for this but one of the most important is that the aircraft can never be proved a success until its development period is behind it, or until several machines have been in operation for some time. On the other hand, until its success has been reasonably established, it is difficult to get people to buy it. There is an interdependence between sales and manufacturing that makes it difficult to have one without the other. As G. R. Edwards has so aptly said, "A winning customer is often conducted by a piece of technology—it helps him to make up his mind."

It is, however, also, that the greatest need for funds tends to come at the time when troubles are most likely, that is, during the early production period.

Facilities—More a successful aircraft was built under ideal physical conditions and it certainly cannot be proved that good working conditions are unimportant. The bureau agent often struggles over obstacles but that fact is not necessarily a good reason for hanging them.

On the whole, more efficient work will certainly be done if layout and drawing office layout is right, if there is adequate space per man, and if the lighting, temperature control, ventilation, and freedom from noise or distraction, meet certain standards. The design area should also be close to the lab, the test laboratory, the mockup, and the experimental manufacturing area.

Dependability—The supply of properly trained and experienced personnel is not enough to meet the demand, the work of every man must be made to count to maximum degree. Given a certain selection of suitable individuals, two factors of organization which affect out-



put the schedule and spirit of the contract and the formal relationship between them, the specified organization chart. Again, spirit counts for so much that it also prevails over pure engineering facts, but why force it to do so? In the design organization—and the same thing holds true elsewhere—two types of coordination must be provided: one, coordination by specialty and by project. Hostile arguments have been held as to whether a specialty or group system is better in either case. In a project system, but it seems to make little difference which is used; they will both work. The important thing is that one or the other form of coordination be given preference when it comes to administrative authority and that it be closely followed by everyone where this preference lies. No case can show two reasons.

On the other hand, be one as it may, the two systems are not mutually opposite or different things. For example, a team of engineers has been told to work on items in which some suggestions are given for some assistance, such as test authority. The chief engineer may have an administrative authority and a design assistant, each separate over the driving effort in his particular field. Or a specialty head may have a research assistant and a production assistant.

Conscious with the great elimination of aircraft design has come a narrowing of the horizons of some of the designers. It is nearly impossible to maintain five such conditions as used to apply 70 or more years ago, when a man was thoroughly trained in one field and competent in many others, and when the designer often did his own stress analysis and weight estimations and followed his design intimately

through all phases of manufacture and test. This narrowed tasking away much of the feeling of identity between a man and his work—the day of the specialist is here, perhaps even more in the U.S. than in Great Britain. But if it is to be lived to be repeated, to keep memory alive and work can be done more effectively. Certain ones can be given some general assignments, others can be moved about from time to time, and a greater opportunity can be afforded to designers to see for themselves the products of their brain in operation.

Everything possible should be done also to ensure that the engineer and designer on the one hand, and those who will manufacture and use the aircraft on the other, understand and consider each other's viewpoint.

Customer Relations—The contract and the aircraft specifications, combined with the written agreement between producer and user, can be of assistance in clarifying the role of each and setting forth what is to be done, as they can be a standpoint within which constructive discussion is almost impossible.

Attempts to define something and to give help for even on reliability are bound to fail, but an agreement can equally be made. Close and simple understandings must be the objective with a measurable degree of loyalty for detail in the project goes along. Where large organizations, such as the government and military services, are involved, things tend to become stereotyped and the individual cannot do much, but some improvements can be made by conventional means and going after them in earnest.

The written word must be supplemented by many personal contacts. These fall into two categories, both of

them subject to abuse, but both very helpful if used properly. The first of these is what might be called common sense letters, the post focusing upon design problems, as they occur, at the viewpoints of manufacturers and operators, and of sub-groups within the sphere of each. The second, or letter after the fact, is the explanation and acceptance process. The first tends to prevent mistakes and the second to correct such as inevitably occur.

These are what seem to be chief among the organizational factors. In some cases they do much to determine the atmosphere in which a project is carried out and its chances of success. Through them all runs the common thread of pure dedication to a common task, which means possibly some about taken these engaged to the task be have in it, love it, and have, as already said, a professed confidence in it.

2. Good Initial Choice

A few years ago there was a moving picture which used to be introduced at otherwise dull technical sessions at the U.S. to liven the proceedings. It was called "Design Colder" and was a compilation of numerous shots of an outfit of naval engineers that had gathered at the dinner table a number of years. There were square jaws, double wings, wrap like a doughnut with a hole in the center, and half-inch wings, but wings, and so on.

Looking at this picture was encouraging, for it was vivid proof of the old saying that even a kitchen stove could be made to fly if it had enough power! But these were men's shirts—military pattern—and none of them had any teeth but to smile. There was a tendency to ask, "Why in the world did that fellow over there to build that in the first place? What made him think it was a good idea?"

Does It Fly a Word? There are no better cases, but all these who have any considerable experience in aircraft design can look back over the years and find examples for which they were responsible which made the same question. The one answer is that it did seem a good idea to someone at the time. Someone in government or from within the military or civil operators in its industry because convinced that there was a need for such a machine. He established a few arguments, convinced someone else, and the ball was rolling.

As it gathered momentum, arguments in favor were highlighted, arguments against were dropped or, personal pride became involved, people became committed, and when analysis of pros and cons became impossible. The project went ahead, the aircraft was designed, built, and flown—usually after



successfully—and then what happened? Nothing. Someone nobody really wanted it, or because the winds would something else. Usually a project will be dropped before the start if it does not fill a real need.

Feasibility—There are two sides to the question of deciding what to build, one is what is needed, the other is what is possible—what should be built or what can be built. There have to be considered separately and in relation to each other is the desire to be a good one, the establishment of a sound estimate of all military requirements. For example, in a high rate of development, the pooling of experience, analysis, and judgment of people with widely varying backgrounds.

The kind of fighter needed five years from now depends not only upon the military requirements, but also upon the characteristics of many weapons and fighter then, and the tactics they will employ. It depends, naturally, on the economy of money which can be spent on fighter as well as on how to spend on other things. It depends on how good other methods of defense, such as missiles, will be by that time.

In other words, it depends not only upon the fighter itself, but upon the whole defense system of which the fighter is part. The same can be said of any other military aircraft.

Systems Analysis—Consequently, in recent years there has grown up a technique of initial choice which has come to be termed "Systems Analysis"—to study analytically and as a whole the military task to be performed, requires the various parts that task, and establish the major characteristics of the aircraft that will best do the job. At least, that is the aim of Systems Analysis. It usually fails short because of the responsibility of setting up the task with accuracy and because, therefore, initial assumptions must be made on a weak foundation.

The great danger of Systems Analysis is that it may be taken as a complete substitute for the exercise of mature judgment. No matter how accurately or objectively a mathematical analysis is done, its conclusions can be no better

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Fastener Problem of the Month

OCTOBER, 1951

PROBLEM: Applications like the illustrated catwalked out fasteners which specify the use of secondary locking devices such as cotter pins or safety wire, present production engineers with the problem of true engineering expense usually operation. Furthermore, a safety wire unit is difficult to replace in the field while cotter pins frequently break in service with nothing but lowering a possibility, as well as damage to other moving parts of the engine from the cotter fragments.



SOLUTION: Self-locking Rollpins offer a simple and economical replacement for cotter pins and safety wire. Rollpins are inserted quickly and conveniently with a lever and do not break. They fit flush with the hex hole of the nut, leaving no exposed ends to break off or lose loads. Rollpin tubular steel construction of Rollpins provides up to 35 times longer life than equivalent diameter cotter pins—plus a vibration proof fit against the walls of standard drilled holes. Not only is installation faster but the Rollpin can be easily removed with a pin punch—can be used over and over again.



YOU WILL FIND Rollpins are the ideal replacement for safety wire, cotter pins and many other locking applications. They offer three important advantages—(1) Faster assembly—(2) Lower maintenance—(3) Better performance. Put self-locking Rollpins to your own test. Write for a free sample packet of assorted Rollpins today. Elcor Shop, New Corporation of America, 2530 Vanhook Road, Union, N. J.



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fast, its angled symphony was the point where the symphony lies in the fact that it reduces some of the elements of the problem to precise terms and thereby makes the real issue manageable by the processes of expert opinion. As time goes on, experience with fast technique will improve and extend it, as old Operations Analysis during the Second World War.

Limitation Analysis: That part of the problem of actual choice which lies in the fact that it is not usually feasible, is often called "Limitation Analysis." One of its end points is a graph on which is plotted, against gross weight and wing area, for a given level of various constant performance characteristics. These results are shown which define the combination of gross weight and wing area, for a given aircraft configuration, that have performance better than certain prescribed values.

These graphs may be prepared for several configurations and thus may assist in choosing between them. Sometimes it is found that the proposed maximum performance have been set too high, in which case there is no choice at all. Assuming there is one, several values of wing area and gross weight are usually chosen with an eye to the possibility that present for further growth of the design.

Limitation Analysis is really a partial definition of what is commonly called "the state of the art," the level reached by the currently doing progress curve. An aircraft designed to such a way as not to take reasonable advantage of the state of the art is handicapped competitively, one designed too far in advance of it, with too much optimistic anticipation, runs into the danger of being an all promising effort.

Aircraft design has progressed as a series of pioneering jumps, combined with a large number of relatively asymptotic evolutionary improvements. Certainly the Wright Brothers preceded. So did many others in what a great deal is owed. At the same time it must be admitted that the process has not always been successful in producing large quantities of operationally useful aircraft. The often has to concentrate on



How TIMKEN® bearings help Hiller flying ambulances save lives

IN this B-23A, U. S. Army version of the Hiller helicopter used for evacuating battle casualties, power is delivered to rotary wing through precision-built Timken®-equipped drive axes. The unit featured below, made by Western Gear Works, Lynwood plant, California, uses Timken tapered roller bearings to assure dependability and long life. The tail rotor gear box also uses Timken bearings.

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and Jet Propulsion Research



Electronic Research
and Device patent

SCENE OF SHAPING IN THE



hard on the problem of doing the job at all that he is not able to do it as well as he himself might on a second attempt—or on someone else who has been watching his struggles may do before the power has had time to recover his physical and financial strength.

► **Carry Over**—This does not necessarily mean that design should not be in advance of the state of the art but it does indicate the importance of keeping one's eyes open to the resulting dangers. It instead of aiming too high, a conservative approach is adopted, a number of advantages become immediately apparent. Experience with past designs can be carried over into the new one with little or no change. The assurance of having a design which will require little development often makes it possible to start production before the prototype has been tested, thus shortening the elapsed time before the aircraft comes into the market.

With cost transport aircraft, one conventionally makes passenger acceptance more sure and makes operators more willing to order while the aircraft is in the blueprint stage—and the customer later more willing to accept such orders.

All of these things make it appear more attractive to do what has been done before but in a slightly different way, rather than to branch out into something new. On the other hand, such an attitude carried to extremes stifles progress and, since there are many subsequent steps in the business and always will be, it leads to being overtaken. On the whole, "carry over" has a great effect on aircraft cost that it must be returned to a nucleus around which a few pioneering efforts evolve.

► **Quantities Paid**—Doubling the number of aircraft produced cuts their unit cost by about 20%. Since versatility extends the market and makes a given budget go farther, there is a constant temptation to combine two or more requirements into one multi-purpose design. If the requirements are sufficiently similar that one can be done with technique, if they are too far apart, the result is a product which really satisfies no one. Fortunately it is one of our transports that makes the market is extensive, the unit cost will be too high

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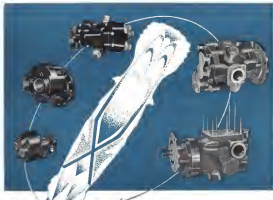
The designer has to ask himself and rather searching questions before attaching a final decision to go ahead with a project. Not only does he have to assure himself that there is a bona fide need for the kind of aircraft he can produce, but he has to ask, "Is there any alternate aircraft already in existence that might be more cheaply and easily modified to meet this requirement and still say new design be sufficiently superior to justify this?" What if my competitor does? Is he so entrenched that it will be extremely difficult, if not impossible, to make headway against him? On the other hand, has he been established in the field so long that he is, perhaps, growing complacent? Should he have brought out a new model some time ago and tried to do so, thus giving me an opening?

The designer also has to make a mental assessment of the availability, by the time he needs them, of adequately developed engines, propellers (if any), and other equipment. There is also a place for gliders, but only for gliders that were designed in such form the start. Designing and building an aircraft in these days of specialization is much like cooking a party dinner—everything must be ready to come off the stove at the same time.

► **Eye Ahead**—A sound choice is made more difficult cause of the element of forecasting in prophecy that enters into it. It is important to look forward to the day, perhaps five or six years ahead, when the proposed aircraft will actually be in service in large numbers and to try to foresee what kind of airplane will actually be needed at that time.

It is possible to cite many instances where spot-on attention to the element of prophecy (perhaps merely an unimagined adherence to current thinking) has resulted in a shabby product. It is equally possible to cite cases where a particularly clever reading of the future, due to unusual awareness of what is going on at the given time, has produced an aircraft which seemed to have little aerial backing but which ultimately had a long and illustrious history.

The aircraft designer, civil or military, works to a set of rules established by the contracting or procuring agency, which might be called "general design specifications." As they go on by these detailed requirements of a general nature because more voluminous, and can be the cause of inferior design. There can be no progress and no cost growth. If the designer fails to work hand-in-hand with the proper authorities towards the improvement of these general requirements, he is failing to give attention to one of the es-



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Setting the pace for jet engine fuel pump development is only one of Pesco's important contributions to safer, faster, more dependable aircraft. It is experience that can be of real help to you.

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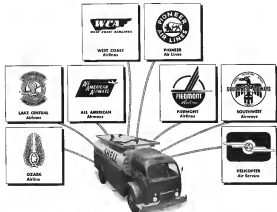


PRODUCTS DIVISION

BORG-WARNER CORPORATION

24700 NORTH MILES ROAD

REDFORD, OHIO



Shell supplies Aviation Fuel to all these local Service Airlines

These 8 airlines are important scheduled businesses . . . vital components of the greatest flying network in the world.

Shell's growth in the aviation industry and in research has paralleled the growth of air transportation in every respect.

**8 more reasons why
Shell Aviation Fuel
flies THE MOST PASSENGERS
flies THE MOST AIR FREIGHT
and THE MOST AIR MAIL
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SHELL OIL COMPANY

40 WEST 86TH STREET, NEW YORK 25, NEW YORK
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usually important elements of good design.

► **Satisfiability** Prime-Superpowered upon the general specifications are the type specifications, which cover those special to a particular kind of aircraft, and model specifications, which define a particular model of that type. The tendency nowadays is more specific, and it is a good one if not carried to excess, is towards type requirements that state the problem rather than specify exactly how it is to be solved—that is, towards negative specifications. This has come about partly as a reaction against the rigidity of design which has crept into specifications, and partly as a result of increasing attention to the success as part of an operating system designed to do a certain job.

On the subject of actual choice, many a project has been derailed from the start because it was ill-conceived. And, peremptorily, steel will choose ones have failed because they were improperly executed. That there is the true criteria of a well-tempered assault—suitability and quality. One without the other is insufficient, but entirely possible, both are necessary for success.

Satisfiability comes last and is forethought. No matter how high the quality, if the design is not suitable for its purpose it will fail. For example, an MG Midget is no doubt a high quality automobile, but its suitability as a house is poor.

NEXT: Details of design

High Speed Flight Test Instrument

A new flight test instrument—the Aeroflex Pickup—to measure pitch, yaw, roll pressure and static pressure up to a Mach number of 5 is being produced by G. M. Chassey & Co., Inc., 274 W. Columbia St., Pasadena 1, Calif.

The pickup, about 10 inches long as the larger of two models which are available, is basically a bullet-shaped transducer with four highly swept fins to maintain weathercock stability. The fin and head assembly are mounted on a universal joint to line into the relative wind at all times.

Model 2519D measures pitch and yaw angles up to 30 deg within an accuracy of 0.2 deg.

Model 25112 is like 2519D with the addition of a potentiometer mounted at the nose. Skin pressure and static pressure are transmitted through the universal mounting with less than a 1% error to pressure pickups.

Both models have high natural frequency, both are suitable for installation in the leading portion of a probe antenna, and both have 0-5 v. dc, potentiometric output.



Vibration isolation and shock protection for Aerospace Equipment

► For the first time, dependable MET-L-FLEX all-metal mounts are available for many different applications requiring 2 1/2 size type units. New standards of equipment performance, previously attainable with conventional mounts, can be obtained without sacrificing weight or cost. High damping and lateral stability, inherent features of MET-L-FLEX, provide added protection for delicate aircraft equipment. Write today for full performance and engineering data on the complete line of Robinson MET-L-FLEX vibration isolation and control systems.

- Load ranges from 1/2 lb. to 10 lbs. per mount.
- Built-in damping with auxiliary cushioning for overload and shock.
- Overload and underload capacities greater than 50%.
- Minimum ultimate structural strength 750 lbs. per unit.
- Temperature range - 90° F. to +175° F.

Available in complete
Unit Mount Series

including the popular 2 1/2 and
5-2 mounting tray case. Write
today for information.



ROBINSON AVIATION INC.
TEKOR, NEW JERSEY

For Dependable Hose Connections

WITTEK
STAINLESS STEEL
Aviation
HOSE CLAMPS

For over a quarter century, Wittek has specialized in hose clamps, devoting craftsmen's skills to producing hose clamps of unflinching economy in design, unflinching economy in engineering, unflinching with superior physical strength, for dependable leak-proof hose connections. This experience is yours when you place your aircraft hose clamp requirements with us.



WITTEK WWS (Standard Type)
Aircraft hose clamp with the Wittek design & type. Tested and proved for dependable service in all types of aircraft applications. Also available in the standard of the industry.

WITTEK WWD (Expansion Type)



Aircraft hose clamp with the Wittek design & type. Tested and proved for dependable service in all types of aircraft applications. Also available in the standard of the industry.

Most aircraft, AN specifications and also C.A.B. approval.

Write for Details



WITTEK
MANUFACTURING CO.
4206 West 24th Place, Chicago 22, Illinois



MARBORE JET TURBINE, capable of maximum 300 BHP for light craft, and . . .



AFIN DUCTED FAN are two of our French engines to be built by Continental

French Turbines Enter U.S. Field

Manufacturing rights to 9 small engines acquired by Continental; for use commercial, military use.

The potential position of small gas turbines in the U.S. aviation field has been given a sharp boost with the introduction of a group of nine new units comprising four turbine designs.

These are not experimental types, but extensively tested powerplants ready for production.

Manufacturing rights to the gas turbines have been acquired by Continental Motors Corp. from France's Societe Turbomeca, which developed the units under sponsorship of the French Air Ministry (Aviation Week Sept. 17, p. 18).

Continental, with its wide experience in the small engine field, should be able to push one of the newly acquired gas turbines into a broad field of application—both military and commercial.

Immediate prospects for the turbine, actively from the military—in general aviation, engine, target planes, utility aircraft and compressor applications. But Continental sees three extremes.

into the commercial market for increasing the utility of medium-size aircraft and specialized industrial equipment.

Continental reports three advantages for the new engines:

- Mileage and an critical factor such as reliability, weight or longevity.
- Lifespan of longer life than piston engines, when operated under proper conditions. The projected service span is based on subjective tests in France, Continental says.
- Small size in relation to power—a factor to provide use in aircraft and in ground installations involving portability and space limitations.

High power-to-weight ratio.

High degree of interchangeability for base parts at various models, simplifying manufacturing and maintenance problems.

• Ducted Fan Design—One of the new engines—the Aegin 12—a ducted fan configuration. Power from the turbine is absorbed by a row of blades (left)

UP THERE WITH THE BIG NAMES . . . CHAPTER NUMBER 7



SKYDROL plies American skies with the Flagship Fleet of AEA

High in the skies over the United States, Canada and Mexico, passengers and crew travel in greater safety on the Flagship Fleet of American Airlines because Monsanto Skydrol is used in cabin superchargers.

Skydrol, Monsanto fire-resistant-type hydraulic fluid, now serves every domestic airline flying DC-6's. Many planes carry Skydrol throughout the hydraulic systems as well as in the superchargers.

Skydrol brings greater safety to passengers, crews and planes in the air and on the ground. In addition, Skydrol means greater economy because its high lubricity reduces wear on working parts of hydraulic systems.

Investigate the safety and economy of Skydrol. Write for details and a copy of the booklet, "More Safety in the Air with Monsanto's Skydrol" write MONSANTO CHEMICAL COMPANY, General Chemical Division, 1700 South Second Street, St. Louis 8, Missouri.

Monsanto Skydrol Offers These Advantages

Skydrol is fire-resistant—meets the new flammability requirements of Aeronautical Material Specification 1580.

Skydrol is a paraffin superior lubricant. Its most refined state lubricity is more than double that of other hydraulic fluids.

Skydrol is stable at required operating temperatures and pressures.

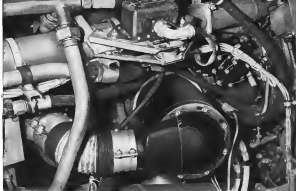
Skydrol is noncorrosive to aircraft metals and alloys.

Skydrol is moisture-free and requires special handling or protective storage.

Skydrol Reg. U. S. Pat. Off.



JOSEPH G. BARTON, WASH. STATE, HARRIS



IN THE NEWS

NEW GENERATOR MOUNT SAVES TIME AND MONEY



Simple as one, two, three! 1. Fit generator into slots of mounting ring (permanently mounted on your engine), 2. engage by a slight turn, 3. adjust and tighten clamp ring. The QAD mount, now be supplied to fit any G.E. aircraft generator. Simple, inexpensive, light weight, the new mounting can be used to mount a generator on piston engines or a starter generator on jet engines.

The tricky job is a mechanic's nightmare when it comes to removing a generator for routine maintenance. General Electric's new, QAD (quick attach-detach) generator mount eliminates the need for removal parts or mechanical skills. Generator replacement time is cut from hours to minutes. The QAD has been selected as an industry standard—for hard-to-get-in installations—by a joint Air Force-Navy committee. It is interchangeable with present generators of equivalent rating.



One man can replace a generator where two were required before, in a fraction of the time. No special tools required... no bleed-benching. And, the time and money saving device may be added to your fleet gradually—as spare units or for overhaul. For further information, call your General Electric aviation specialist or write, General Electric Company, Schenectady 5, New York.

Quality equipment for aircraft

GENERAL ELECTRIC

located in a circumferential duct extending from the air intake to the rear of the engine. The air, forced by the fan, is pushed out to a discharge opening. Thus, the engine is a turbojet engine powered with a supplemental set of cut down propeller blades.

Characteristics of the engine are between those of a turbojet and turbo-prop. For a given fuel flow, thrust is substantially higher under static conditions than a turbojet, but lower than a turbo-prop. At high flight speeds the solution is obvious; the duct has developed more thrust than the turbo-prop, but somewhat less than the pure jet.

The British and the Germans did early work on the ducted fan design. Theory of the configuration previously was revealed in *Airpower* Winter (July 11, 1969, p. 25).

Contractual says that when installed in a 4-engine aircraft with other characteristics about the same as present airplanes of that type, the ducted fan engine will make possible a cruising speed of about 500 mph as compared with about 370 mph at present. (Obviously, the altitude would have to be increased to take that higher speed.)

Contractual says the engine weighs 300 lb. thrust, weight is 200 lb.

► Other American-Aachen of the engine is the Turbojet II, offering 150 hp and weighing 115 lb.—about half as much as a piston engine of comparable output, Contractual says.

Others in the series are the Pulse with a thrust of 150 lb., and the Marlow II, pushing out 100 lb. Fuel consumption and weight of these jets is reported by Contractual to be "comparable to those of the very largest military turboprop."

These two units are slated especially for use in the 400-500 mph class, such as target airplanes. And they would also be applicable as booster units for military jet takeoff and climb for bombers and transport where extra load is required or with takeoff from high-altitude fields, reports Contractual.

The Pulsar turboprop is another unit, functioning as an air compressor, putting out 7.5 hp/sec at 50 psi. It can be used for starting large jets, for jet engine starter drives, and for pilot wheel steering systems, as well as for operation of air power tools.

► Meanwhile, in addition to these units, others of the family, though not reported by Contractual, are believed to be the Aspen II, another ducted fan with takeoff thrust of 140 lb. thrust and a weight of about 275 lb., the Airborne II, a shaft turbine of 400 hp weighing 190 lb., the Pulsar jet, with 262 lb. thrust and a weight of 118 lb., and the Pulsar, another air generator putting out 1.3 lb. of air/sec at 50 psi.

Initial production of the Turbojet engines will be handled by the Continental subsidiary—Continental Avionics

10-times

THE AN
ENDURANCE LIMIT
REQUIREMENT...

New
ADEL

**AN 3000 AND
1500 PSI HYDRAULIC
SHUTTLE VALVES**

PRESSURE PORTS
SHUTTLE VALVE
RETURN PORT

Outstanding Features:

- ★ ENDURANCE TEST—20,000 SHUTTLING CYCLES, 3000 PSI (AN REQUIRED—2,000 CYCLES)
- ★ SHUTTLE IS "ONE PIECE" CONSTRUCTION
- ★ AN APPROVAL ON ALL DASH NUMBERS VALVING FOR AN-6209, AN-6217, AN-6277 AND AN-6278
- ★ ALL AN ENVELOPE AND SIZES -4, -6, -8, -10 AVAILABLE
- ★ MEET OR SURPASS ALL REQUIREMENTS OF SPECIFICATION AN-V-3a
- ★ BAKED FLOW CAPACITIES—1.2 to 10.6 gpm
- ★ TUBE OD 1/2 to 1 1/2

The worldwide leader in aircraft hydraulic components and systems... ADEL DIVISION, GENERAL ELECTRIC COMPANY, 1000 CENTRE STREET, NEW YORK, N.Y.

ADEL LEADER IN HYDRAULICS

DIVISION OF GENERAL ELECTRIC CORPORATION • BURLINGTON, MASS.

CANADIAN REPRESENTATIVE: ENGINEERING CORPORATION, TORONTO

U. S. NAVAL AIR DEVELOPMENT CENTER
JOHNSVILLE, PA.

takes its
ENVIRONMENTAL TEST PROBLEMS

to **Tenney**



Maximum flexibility, efficiency, dependability—these are essentials of test-chamber design for military research use. And these are the qualities engineered into the Tenney Test Chamber recently installed at the U. S. Naval Air Development Center, Johnsville, Pa., for environmental testing of aircraft components.

Specifications: Altitude to 80,000 feet; humidity, 20% to 95%; temperature, -100° F. to +200° F.; any temperature-altitude conditions simultaneously; automatic program cycling; control with minimum elapsed time for obtaining all extreme conditions.

For all types of testing—development, research, specification, and production—a Tenney-engineered chamber will meet your requirements. For testing under all degrees of humidity, at all altitudes and temperatures, a Tenney-built test chamber assures complete dependability and precision controlled test data. Automatic cycling, radioing, and/or recording systems to your specifications, if desired.

For further information without obligation, write Tenney Engineering, Inc., Dept. 42, 38 Avenue B, Newark 5, New Jersey.

Test Chamber Design for Every Industrial Use

Tenney

Manufacturers of Automatic Temperature, Humidity, and Pressure Control Equipment

and Reporting Corp., which is co-producing its exposition.

Meanwhile, the arrangement with Turbomeca calls for continuing cooperation in future development work.

Another Turbomeca gas turbine—1400-hp unit—is also slated for mass production in this country. Two engines—the Gerdoo—will be built by Pinnacle Engine and Avco Corp.'s Stratostation, under licensing agreement with the French company. (AVIATION WEEK, Aug. 27, p. 31).

Subcontracts Build Cessna's Backlog

While Cessna Aircraft Co. now has orders for more than 3,000 of its L-179 Bidding Army liaison planes, its other military subcontracting business represents a larger part of the current backlog of 550 million, the Wichita-based firm announced last week.

Other orders include some 516 mil tons from Lockheed for assemblies of all fuselages and tails of Lockheed P-59 interceptors and T-33 jet trainers at Cessna's Prospect plant, an unattached industrial order for tail assemblies for the latest Douglas B-47B bombers, for delivery across the airport from Cessna to the Boeing Wichita plant, and major components for the new Republic F-105 sweeping jet fighter which General Motors Corp. will build at Kansas City. These components will be built at Cessna's enlarged Hutchinson, Kan., plant.

Meanwhile Cessna continues to make commercial four-place Model 170 airplanes at the rate of two a day, while the majority of its larger Model 440 series production is now going to the Army with the designation, LC-130C. Yet another source of business is in Cessna's production of body and equipment for farm implement companies.

Arrangement of a \$1.5 million contract agreement of 510 million has recently been completed to cover expansion in facilities building in an overall addition of 475 more floor space and for working capital.

NAA Subcontracts

Since 4,600 outside firms collect up approximately 32% of every contract dollar given North American Aviation, Inc., by way of subcontracting and furnishing parts, supplies and services.

With a backlog over \$510 million in military aircraft, NAA estimates that approximately 135,000 men and women in the Los Angeles area directly benefit through its outside buying. NAA itself employs 24,100 people in its Los Angeles area plant, 7,500 at its Columbus, Ohio division, and is preparing to open new facilities at Fresno, Calif.

Deep-Drawn in 2 DRAWS

with
ADVANCE TOOLING



Deep-Drawn part shown with
Advance Die from 21 1/2" steel block.

THIS DIFFICULT STAMPING SIMPLIFIED BY NEW ADVANCE TOOLING METHOD

Here's another example of ADVANCE tooling ingenuity. The problem: this deep-Drawn tank plate deep-drawn to the dimensions shown above . . . in just two draws . . . from a 14-gauge steel block. Similar pieces were formerly produced with five or six draws, or by hot-rolling two halves.

Advance tooling techniques meet the requirements — with dies that produced the part in two draws as explained. Advance can help you with your difficult drawing and stamping problems . . . and save you time and money in your processing operations. Our engineers and our completely equipped die plant are ready to serve you. Contact us — or write for complete information.

Write for
Illustrated
Descriptive
Bulletin



ADVANCE DIE & TOOL CO.

6800 MADISON AVENUE

CLEVELAND 9, OHIO

(MON. WEDNESDAY)



MARTIN MATADOR AF-62 missile, is posed on truck loading cradle. Weapon is about 58 ft. long, but this swept wing. Basic power is supplied by Allison jet, but control pods (in) by RATO and (above) as ...

Firing the AF's First Missile In Service Use

Story on Air Force Missile Test
Center begins on page 53.



MISSILE BLASTS off its perch at angle controlled by hydraulic adjustment on launching cradle, for flight. Its initial speed ranges ...



ROCKET CONTINUES

peak and trajectory is still increasing
line (arrow indicates its air intake).
Power expended ...



ROCKET FALLS

away, with firing done
(arrow) beginning to close
and trajectory taking away.

On tough sealing jobs like this ...

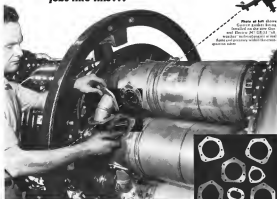


Photo at left shows
Goetze gaskets being
installed on the new Gas
and Diesel JET-200 "H
welder" independently in mid
April and previously within three-week
periods.

J-M Goetze Gaskets guard against critical flame and pressure leakage

Keeping flame and pressure from leaking
where gases ignite takes constant care,
even as the new JET-200 "H
welder" outposts engine is a typical ex-
ample of the difficult and critical sealing
problems that are solved with Goetze
union-critical metal gaskets.

The particular Goetze gasket for this
job is a multi-layered stainless steel
gasket—made to fit tight and stay tight
in service. It withstands temperatures to
1500° and all operating pressures com-
monly encountered in this type of service.
Its flexibility prevents against vibration,
expansion and contraction.

Like all Goetze gaskets, this system backed
by more than 60 years of Goetze "know-
how" that has solved many of industry's
most complex sealing problems with gas-
kets of every design, shape, and size. And
it is made as the same modern methods
the entire Goetze system to fit every
order with reasonable promptness.

For further information about Johns-
Manville Goetze gaskets, and other
J-M products for the aerospace industry,
write for Brochure AV-14, Address
Johns-Manville, Box 200, New York 10,
New York. In Canada, write 395 Bay
Street, Toronto 1, Ontario.



J-M Goetze Gaskets can be fabricated in
any shape for sealing every system with
confidence. A few examples are shown here.



For further sealing through J-M Goetze Gaskets
helps prevent the sealants required in over
three million seals annually encountered.



Johns-Manville

**PRODUCTS for the
AVIATION INDUSTRY**

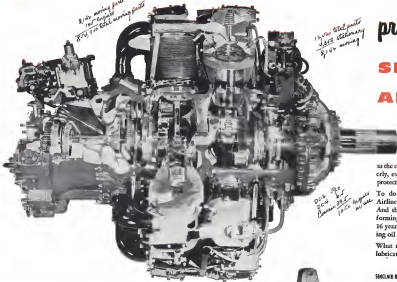


854,910 parts

moving every second...

*8,416 moving parts
100 engines
854,910 total moving parts*

*12,000 total parts
483 stationary
8,416 moving*



*Does 854,910
parts for
100 engines
8,416 moving parts*

protected by

SINCLAIR

AIRCRAFT OIL

In each of the huge Pratt & Whitney engines that power the Constells and DC-6's of American Airlines' Flagship Fleet, there are an estimated 7,642 vital parts that are constantly on the move as the engine roars along. For these engines to operate properly, every one of these moving parts must be completely protected from friction and heat with a dependable oil.

To do this vitally-important lubrication job American Airlines has chosen SINCLAIR AIRCRAFT OIL...exclusively! And the fact that SINCLAIR AIRCRAFT OIL has been performing this job now for American Airlines for over 16 years tells the story of how effectively this fine lubricating oil does its work.

What more can you ask of an oil...for your own vital lubricating needs?

SINCLAIR REFINING COMPANY, Aviation Sales, 400 Fifth Avenue, New York 20, N. Y.



Engineered!

Don't guess on runway lighting; use L-M Airport Lighting Engineering Service

The planning of an airport runway lighting system is vitally important. L-M offers you a complete runway lighting engineering service.

L-M has been in the airport lighting business for many years. Its engineers know lighting. More important, they know what the pilot must see, and do, when he is coming in for a landing. The solution problems of a runway lighting system are as important as the electrical and the optical problems.

L-M has an extensive staff of field and headquarters engineers who are familiar with airport lighting problems and requirements and whose services are available to you.

The service includes analysis of the problem, planning, consultation, specifying of equipment that will meet the requirements and come within the budget, checking of the installation and instruction of your personnel to insure efficient, economical operation of the lighting.



Get this Engineering Data Check Sheet

Ask for L-M Field Engineers for the L-M Airport Runway Lighting Data Check Sheet, or write L-M Airport Engineers, Airport Lighting Division, Milwaukee 1, Wis., or McDevitt Electric Company, Detroit.

LINE MATERIAL... Airport Lighting



Here is some of the complete L-M Equipment for Small and Large Airports



L-M's famous 100,000 cp. medium intensity runway lights, type L-11E.



L-M high intensity runway lights with fixed bases, type L-12D.



L-M medium intensity runway lights for smaller airports, and for runways at large airports.



L-M revolving beacons for Class I, II, and III airports.



L-M marker and obstruction lights, single or double.



L-M runway end lights for large and small airports.



SOUTHEAST ACROSS THE ATLANTIC, tracks out from Florida, diverted from...



CONCRETE BLOCKHOUSE housing instrumentation and men who record results.

Where Services Test Missiles

Building of range to fire new weapons is farther along than the development of the missiles to use it.

Three years ago, the Joint Long Range Proving Ground was established at Egmont River, Fla. By this time next year, the range should be complete and in its current 1,000 sq. mile. Then the only problem will be getting a missile able to see the range capacity.

One year ago, a group of disappointed aeronomics, technicians, military and civilians watched the first missile firing from the test site at Egmont River-CR-Douglas Research Center.

Comment Status—Recently, Avonmore West sent a correspondent to the proving ground—recently redesignated

as the Air Force Missile Test Center—to investigate the current status of the range. His report sounded somewhat like the words of the hypothetical 1,000,000 hp engine—"Now that we've got it, what are we going to do with it?"

The range now being used by Glenn L. Martin Co. covers only a small portion of the range's capabilities. And because, writing to make such, is intended in aerodynamic studies, hardly the type to require more than usual distances.

Apparently this is one of the few ones in aerodynamic history when test



FLOATING ANCHOR

New in casting, floating, and right-angle beam—this register or counter-ank device for welding—permanently assembled or with removable web. For similar applications where fast is desirable—specify Plate-Loks.

GANG CHANNEL

The unique Plate-Lok that assembled into straight channels, cross-channels, cross-channels or permanently attached into straight channels. In a wide range of end spacings are available—standard heights and spacings are supplied to your order.

ANCHOR

Plate-Loks in anchor form to meet your every requirement—plate anchors, angles, cross, angles, right-angle, etc. Plate-Loks is fully approved under ASME and ASME for the general building industry in great applications and structural breakdown due to sudden changes.

FORWARD Tell us about your industrial problems. We'll supply experimental quantities free.

CATALOG Write for your free copy NOW!



Boots Aircraft Nut Corp.
STAMFORD, CONNECTICUT

TAC does what no other tool can do!



AT LAST! AN OPEN-END SATURATE WELDING—the world's first true internal weld. Widely endorsed by aircraft manufacturers and servicing operations. This patented process is used for "insensitive" corrosion on tubing, rods, piping, conductors, shafts, etc. Smaller effective penetrating (avg. .001"-.015") than TIG. TAC operates all of your working jobs.

effect of saturated weld for safety



Manufactured by
TURBINE APPLIANCE CO.
102 Bell Parkway 10711 Los Angeles, Calif.

important in packaging!

STRETCH... *Boasting power...*



Specify
NYLCO
Strength-Stretch
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Write today for Free brochure
and specification book #412

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Represented nationally by leading
packaging engineers.

• MICROTORQUE Plastic Banders and Fasteners—converts an 800 to 600 ft. in. torque to 1000 ft. in. torque for use in applications where the position of the instrument packaging groupings and of parts contained in groups must be repeated, and Guarded also the side motion of MICROTORQUE Plastic Banders, a variety of inclination meters and torque meters.



Microtorque
Plastic Banders and Fasteners
Microtorque 1, Delmar

giannini

NACA Reports

(NACA Technical Notes are informal papers printed in limited quantities for domestic use only. They are obtainable, free of charge, only by persons having a professional interest in them. Write to the Division of Research Information, NACA, 1704 F St., N. W., Washington 25, D. C.)

• **Turbulence-Intensity Measurements in a Jet of Air Issuing From a Long Tube (TN 2161)—**by Barney H. Little, Jr. and Stafford W. Walker.

The purpose of this report is to obtain quantitative turbulence data in order to correlate flame-propagation velocities with local turbulence intensity. Data are presented for a subsonic jet with fully developed turbulence flow issuing from a pipe. By measuring this pipe consistently with a large pipe, and by measuring the mean velocity in the mean velocity in the mean pipe, boundary conditions were determined. Four correlations were drawn from the investigation.

• **Turbulence in the jet was not isotropic.**

• There was no systematic variation with Reynolds number for the ratio of the longitudinal turbulence velocity to local mean velocity at pipe exit.

• There was no consistent variation in the ratio of radial turbulence velocity to local mean velocity with Reynolds number at any distance.

• Near the pipe center line, both longitudinal and radial turbulence intensities were constant from the pipe exit to a distance 5 diameters from the exit.

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USAF CONTRACTS

Following is a list of recent USAF contracts awarded by Air Materiel Command:

• **Consolidated Valve Assembly Corp., Ft. Worth, Tex.** development of remanufactured valve assemblies for hydraulic systems for military and commercial aircraft. contract #14-00000.

• **Delta-Airplane Aircraft, Dallas, Texas** development of test air engine for commercial aircraft and engine modification for military aircraft. contract #14-00000.

• **Bradley, Stewart Co., Inc., Los Angeles, Calif.** development of production of 1000 aircraft, contract #14-00000.

• **Boeing Aircraft Co., Seattle, Wash.** development of production of 1000 aircraft, contract #14-00000.

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• **Boeing Aircraft Co., Seattle, Wash.** development of production of 1000 aircraft, contract #14-00000.

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LEBANON Castings
ALLOY AND STEEL



EQUIPMENT

New Anti-Fouling Sparkplug

Boring claims "first significant change in 30 years" meets all aircraft piston engine needs today.

A major advance in sparkplug design, promise to overcome many short-comings and greatly increase life and dependability of these parts, is seen in a new "anti-fouling" plug—developed by a firm not even in the business.

The inventor, if the plug proves out competitively, go to Boring Airplane Co. and one of its service engineers, Clifford Y. Wright, who developed the basic design as a sideline. Boring took on further development, but now and believe the much-improved "best" significant sparkplug design change in 30 years. The company plans to turn the new design over to a sparkplug manufacturer for production and presently is awaiting test loading from its field.

Lightplugs. Too-Pyoff from a manufacturing and procurement standpoint is that a single model of this plug meets all aircraft piston engine needs, Boring stresses, eliminating scores of different models now required. Tests show it can be used in lightplugs engines as well as those powering military planes. Reason is that the plug has a much wider heat range than present types and performs satisfactorily both in "hot" and "cold" running engines, the company explains.

Essentially the new part is designed to give better protection to electrodes from wear and tear in the cylinder, prevent carbon buildup, assure more precise control of heat on critical air-fuel and rate combustion efficiency. Electrodes in this plug don't project directly into the cylinder, as in other types. Instead, they are recessed within the plug's structure in a "pre-combustion" chamber. The chamber, a water-tight offset, opens into the cylinder and shields the points and other critical elements from the impact of heat, erosion and fouling. Configuration of the chamber is such that it produces a jet-like flame that sports out from the plug with the explosion well developed by the time it reaches the cylinder.

This will serve to produce more complete and uniform burning of the fuel, says Boring, and to "pump" the plug chamber of carbon.

► **Longer Life.** Chemists design wrinkles, extending around the flexible blower, permit the plug to dissipate heat more



rapidly than other types, say the designers. This and the features already mentioned combine to eliminate the need to pre-set plugs. To prevent fouling, they must be hot, but for long life they should be cooler operating. By the combination of features in the new plug, both anti-fouling characteristics and resistance to breakdown are gained markedly, service techs decide.

Broader long life and anti-fouling advantages, these features give the plug

a higher pre-ignition rating, result in improved starting, smoother and slower idling, and smoother, more rapid warm-up with no increase in fuel consumption, says Boring.

Being points out the idea of retreating points on the plug has been tried before, but designers shun "... find it inferior power and performance because of the lack of proper design release steps." The firm simply says it has succeeded in obtaining high performance while giving better protection to the plug "... by controlling heat dissipation and the point of ignition for maximum efficiency."

► **Performance.** Some test results. In a trial of more than 60,000 hrs. of use, test results in various makes of old cars with engines in poor condition, started and plugs loaded as 150 to 170 in., while there were no signs of fouling after 4,000 mi. with the new plug. Other tests indicate the plug runs 20 deg. cooler under normal conditions and reduces exhaust gas temperatures by as much as 25 deg. In service tests in a Pratt & Whitney R-1300 engine under extreme loading conditions (fuel contained five times the normal amount of lead), the Boring plug continuously operated for 70 hr. while the best plugs on the market failed within 25 hr. Other tests showed the same plug adaptable to emergency power conditions in the P-51 1500-hp. Wasp Major and to small engines in light planes. The new plug ran on two octane standard lower than other plugs and still within the same knock-rating as the others, tests at Standard Oil Co.'s laboratory in Richmond, Calif., have decided.



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in this completely new design

Now you can have a lightweight, continuous-duty, explosion-proof motor. This new construction in integral horsepower ratings represents another Westinghouse first in the Aviation Industry.

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pounds. They are available with standard AND mounting pads or with special mountings. Radio noise filters are furnished. This new design has been explosion-proof tested according to USAF specifications.

Look into this new motor. Call your nearest Westinghouse Office or write Westinghouse Electric Corporation, Aircraft Department, Lima, O. 46004

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Why American Likes Its DC-6s

Recent \$35-million order was based on AA's experience: high speed, heavy loads, few maintenance problems.

Faster—Greater speed and ability to carry heavier loads over a longer range with a minimum of maintenance difficulties have sold American Airlines on its new Douglas DC-6B fleet.

These factors, proven on the company's transcontinental routes at an average daily substitution of 6 hr., 40 min., were the reason American recently decided to spend some \$35 million for 24 more DC-6Bs and an DC-6A freighter which it will begin to put into service in 1953. One spokesman for the carrier said, "No other plane has ever considered."

There are now 11 DC-6Bs of AA's original order in service, with no more in process of delivery, and they have satisfactorily piled up over 12,000 hr. of flight time. Although still considered as

the shaking down stage, the craft have gone into service mainly, according to W. E. Spurgeon, assistant manager of service engineering. Because the B is a new design, a completely new plane, AA personnel have experienced little difficulty in servicing and maintaining it.

But experience with six earlier DC-6s has prompted the carrier to install some minor items in its DC-6Bs.

► **Cabin Conditioning.** The improved air conditioning system, particularly in the lounge, now permits passengers to smoke again and pipes, then departing from the long-established rule making U. S. carriers leaving smoking to cigarette only. The lounge table has been removed because this facility recovered cost faster, which limited the



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lounge's use to those passengers playing and did not give more people a chance to change their seats.

Hermetically sealed instruments removed from the air conditioning system since they have been designed accordingly.

AA is considering installation of the new Douglas high capacity radio equipment which will be available within a year, according to Simmons. These Movers will increase its output from 1,100 en. ft. a minute to 1,700. The B's present cabin atmosphere system was Skydial, which AA says has the advantages of fire resistant qualities and an improved lubricity making for longer moving parts life.

Cabin and Ferochology—Improvements have been made in the work water level to eliminate heating difficulties. These include: extreme use of rubber hose, sealing of lines through the fuselage interior, electrical blanket heating at the water outlet. Also, water tanks have better valving and are made of heavier material to prevent leakage.

An increase in service life of toilet facility components is foreseen through use of heavier, standard units and fixtures. Flammable signs outside each rest room indicate whether they are occupied or vacant and identifying all numbers on each door have increased confusion.

Aviation is used for the cable wiring instead of ground, making for easier cleaning and longer life.

Sealing—Airplane—American's DC-6 accommodates 52 passengers and has a large cargo compartment forward. It is not planned to convert that space for seating passengers.

Capacity Growth—Simmons also says American is expanding its seating and cargo capacity may be appreciated in comparing present and future capacities. With the DC-6B the overall is now seating, total seat capacity for its new fleet comes to 6,752 and cargo capacity to 491,000 lb. When the current line its other DC-6B fleet in operation, sometime in 1951, seating will jump to 7,912, if no further equipment is purchased.

They figure, however, may be placed in other ways—for instance, if AA should convert further planes to high density air coach service. It now has four 70-passenger DC-6B flying and it is understood it would like to convert four more as soon as the planes can be spread from their current base.

AA's cargo capacity now runs to more 477,000 lb.—the six DC-6B still due, the 24 on order, plus the six DC-6B on order, could raise this number 902,000 lb.

Loading weight on the DC-6B is 85,000 lb., an increase of 10,000 lb. over the DC-6. Tailored weight increased from 71,800 lb. to 108,800 lb.

Revised of the D-W R-3000

As the huge multi-billion dollar Aviation Industry swings into Peak Production...thousands of Manufacturers with products and services ranging from sub miniature Avionics to Precision Components of Engines and Accessories...to Mammoth Tools for Structures and Fabricating Equipment...take up their role in the Rearmament Program. This is your No. 1 Market...your greatest Potential for Volume Sales.

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As the chart on the right indicates, AVIATION WEEK's gain for the first nine months of 1951 is 592 pages over the similar period of 1950. This increase alone represents more pages than any other Aeronautical Publication has carried in total advertising volume for the nine months period (Jan.—Oct. 1951).

For facts about the great preference accorded AVIATION WEEK by the industry's Management and Engineering Personnel, get in touch with your nearest AVIATION WEEK representative.

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AVIATION WEEK



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Designing and building compact, light and efficient equipment for cooling and pressurizing aircraft is a Stratos specialty. Typical of Stratos creative engineering is the air cycle cooling unit which conditions the air for the crew of the Boeing B-47. Weighing less than 55 pounds it delivers 50 pounds of cooling 3 degrees Fahrenheit per minute. Like other Stratos equipment it can be relied on to give long and trouble-free service. Stratos cooling units with air flow capacities ranging from 12 pounds/min to 80 pounds/min are standard equipment on many current aircraft of the Navy and the Air Force.

Stratos units, engineered to the precise requirements of the installation, are now in use in such troop carrier aircraft as the McDonnell F2H2, Douglas X-45D, the North American YF-105A and such commercial aircraft as the Convair 440 and the Lockheed Constellation.

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caught fire while the plane was making a stall approach under control of the autopilot—apparently complex terrain. Even with the loss of one engine, the "autopilot took over and made a perfect landing," according to Ed Chalka, Lear pilot at the controls. He added that that, as having his "hands and mind free to fight the fire" was rather morbid in getting the aircraft down without injury to the passengers and little damage to the plane.



Blower Clutch Selector Valve

A new, electrically operated blower clutch selector valve (shown) for liquid engine supercharger control has been put on the market by Adol. Jensen, General Metals Corp.

Manufacture atop of the 2-position unit that mechanical linkages and adjustments are eliminated, high blower position is actuated by engine oil pressure, device is spring-loaded to fail safe, low blower position, valve is light, simple constructed and inexpensive.

Address: 10777 Van Over Street, Redbank, Calif.

Sleeperette Seat

Another new aircraft seat is going into production.

First used, developed jointly by Aero-therm and Ray Aerobath Wood Airways, it, according to the maker, the first seat to be designed as a sleeperette seat from the ground up, then adapted to regular seat purposes, rather than the reverse.

PAA engineers and Ray Aerobath designed, developed, tested and delivered a prototype seat as three variants. The first seat, according to PAA, comfort, maneuverability, light weight and good appearance.

The seat has a telescoping center arm rest. This permits a passenger to avail himself of both seats when possible without having to dispose of a removable arm rest.

It will be possible to replace small, detail parts instead of major assemblies. This should reduce maintenance of the seat.

Called the Model 440-2, the seat is

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The nut can rotate to 65 deg. at a steepness, can be limited to 45 deg. in a dry plane installation and has a normal position of 17 deg. The lock nut can be tilted full forward to about the horizontal position to facilitate loading and reduce obstruction in the corner of plane is used on a combined passenger-cargo flight.

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Reflector Paint Speeds Output

White paint applied to the plant floor at service stations located the 3-29 bomb bay being modified at Lockheed Aircraft's Muskegon, Mich. plant, reflects four times as much overhead lighting as before and has made work for night inspection lights on each structure.

The paint is Speed-Rite, containing a resin called Duxone, being prepared of fast drying, good adhesion, and resistance to many solvents and abrasion. A hard wax is applied over the paint to protect the white surface and make cleaning easier.

Previously considerable difficulty was experienced in repairing the exterior lights and it required a good deal of the worker's time. Now the plant's overhead fluorescent lighting does a double-duty job.

Spark Advance Gives PAA Fuel Savings

Spark advance on Pan American World Airways Pratt & Whitney R-4160 engines (used on the Boeing Stratocruiser) will save the airline money, its engineers told AVIATION WEEK.

The spark advance, used during cruise, went from 20 deg. before top dead center to 33 deg.; then to 28 deg. at the 26-deg. setting. PAA estimates that assembly fuel consumption economies can reach 13%. This amounts to about a 1,316-hr. weight saving on an Atlantic crossing.

Concurrent advantages of the system are reduction of exhaust temperatures by as much as 10 C and the two-position reduction's beneficial effect on the turbochargers.

At one point the engine hardly got 400 hp out of the unit. They are now up to a 900 hp evolved period.



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beginnings in the 108-132 net band, has been placed on the market by Radio Apparatus Corp.

The set, Model ARI, can be connected to an a.c. or d.c. power source. It permits all lower instructions to incoming and outgoing aircraft to be received by anyone concerned with takeoff and landing safety of private, commercial or military planes, over the entire. The unit is enclosed in a black, plastic cabinet, measures 10x10x10 in. and weighs 7 1/2 lb.

Radio Apparatus Corp., 330 First Street S.W., Edg., Indianapolis.

Plane Cover Fabric

Production of Arma 25, a tough, plastic-coated fabric developed especially for use on aircraft, has been announced by Placidin Products.

This modern plane fabric, coated by a Nylon base compound, can be used as external covering for wings, nose, fuselage and other surfaces, says Placidin. It is suitable for many planes of aircraft construction, the company adds. Arma 25 is said to be lightweight, has high tensile and tear strength and can withstand temperatures from -50 to 250 F.

Placidin Products, El Monte, Calif.



40G Seal Fitting

A new attachment fitting for use on seats and bunks in aircraft, capable of handling loads up to 40 G and with easy locking and unlocking features, has been placed on the aviation component market by Gordon D. Brown & Assoc.

The fitting, a close-coupled device consisting of pins attached in a collar, is designed to secure seats to the aircraft by engaging, in locking position, steel and AN 516 studs in the floor. Locking pins are positively locked as attached length by sliding the collar up or down. And to facilitate placement or removal of the seat, the pins stay open as long as the collar remains in the unlocked

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(top) position. Fitting is designed so a vertical motion can be used to install or remove pins. Here the bottom of the part is free of interference, since it's designed if the unit is dropped over it. Gaudin D. Brown & Assoc., 487 R Commercial Center St., Beverly Hills, Calif.

Decked Up Switches

New cherting type rotary switches, having up to 30 positions and designed for waterproof mounting, have been placed on the market by United States Instrument Corp.

The switches, Type 16, 18, 24, or 30 positions, represent an advance in design over cherting (made before bank) rotary switches US formerly produced and meet rigid government specifications, the company reports.

A typical unit carries a large number of contact points on multiple decks, each deck being a self-contained, self-aligning part that can be quickly removed and replaced. Two decks are standard on a single contact, but more can be added if desired. Switches are sealed for watertight mounting by "O" rings on both shaft and mounting bracket, are built to withstand severe vibration and shock and effects of tropical salt spray.

United States Instrument Corp., 499 Broad St., Roseland, N. J.

ALSO ON THE MARKET

Aircraft equipment can be tested and serviced in the shop with the Universal Power Source. It supplies d.c. output from 100 to 1,000 watts, providing continuous variable source of filtered power, 0-250, d.c. Electro Products Laboratories, Inc., 4381 N. Ravenswood Ave., Chicago, Ill.

"Limited Product Laboratory" has a network of customer, tools and materials calculated to meet parts service needs at small subassembly taking delivery orders. George Nelson Co., Inc., 390 Lafayette St., New York 12.

Condensing filter for compressed air lines condenses and separates moisture from air then passes air through Fibrous filter cartridge. Pressure is not appreciably reduced. Filter lasts for years and only maintenance is draining to remove water and oil, says maker Air Line Engineering Co., 4755 Warren Rd., Cleveland, Ohio.

Thermal Detectors, for setting left hand threads, now are available in standard stock sizes. These tools, designed to generate a threaded hole by a true broaching cylinder, are said to be less subject to fracture than conventional taps because of low torque required to form thread. Sherratt Tool Co., P. O. Box 796, Reno, Calif.

Fenwal DYNAMIC fire and over-heat detectors widely used on turbo-jet planes

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Fenwal Detectors are easily installed — single terminal allows no error of connection. Units are shock and vibration proof. For complete details on how they can be made to meet your specifications, write us direct. Fenwal, Incorporated, 1070 Pleasant Street, Ashland, Massachusetts. 111 South Burlington Ave., Los Angeles 4, Cal.

Fenwal THERMOSWITCH Aircraft Heater Controls can be used as control units or limit switches for cabin and de-ice heaters.



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FINANCIAL

Why the Merger Hearing?

• CAB long has wanted to spur "desirable" combines, but the hitch is that it has no power to force any line to merge against its will.

• So it opens the Delta/Northeast case to all comers, hoping one will come up with a practical proposal. Odds are the proceeding will be long—and fruitless.

An ambitious attempt to spur "desirable" airline combinations is in the making as the Civil Aeronautics Board proceeds behind the "New England-Southern States Merger Investigation." The latest presentation promises to include an all-out cut of all air services serving the East Coast. The will permit at least nine trunk airlines and all local service lines to get into the act.

In a broad sense, this current proceeding stems from the merger proposal filed more than a year ago by Delta and Northeast. As these two carriers do not consent, their proposal has been viewed as a challenge to gain additional rule-making and a long sought entry by Delta into New York. It appears that the CAB did not view this proposal very favorably but used it as a vehicle to broaden an investigation of the air transport network serving the East Coast.

It is important to note that this case proceeding is nothing more than an investigation. The Board simply has not had the power to compel airlines to merge. This has been recognized and is stated by CAB itself.

The Board can, however, through various means, prod airlines to combine. Control over the award of air certificates is a powerful weapon in this respect but the Board has been most reluctant to apply it in this manner.

Further, the issue of duplicating route mileage can also be applied in a lever but has not been so utilized.

• **Merger Hints**—The Board is now entertaining the possibility of a merger or consolidation of National with Colonial and/or Northeast. Also being reviewed is the possibility of a full merger of the carrier of Capital and Northeast with/into Colonial in such fashion as to permit single carrier service from Delta's system to New England.

It becomes apparent that Eastern Airlines would be most directly concerned with any or all of the above possibilities and may be expected to

reimpose these views on the subject. To make the investigation more interesting, it has been reported that a group has been attempting to effect a Northwest-Capital combination. This could facilitate the consent of Capital Routes Nos. 35 and 51 in the case of a new north-south trunk carrier by providing a major link from Atlanta to New York but of little consequence in a new transcontinental pattern. This, in turn, could cause United and TWA to make separations.

Obviously any proposed consolidation at the main pattern along the East Coast is going to affect all of the local service lines in the area. This will automatically make All-American, Lake Central, Piedmont, Robinson, Southern, and Western proceeding participants.

• **Repercussions** in the Air-Old course, the various combinations seem to be expected to have definite views as to how any changed air service pattern may affect their facilities. In addition to the control changes of ownership, reorganization, route changes, the Board must also be able to make quick action.

With this background of involved and conflicting interests it is self-evident that any merger or consolidation will have a turbulent course to permit even modest the most desirable circumstances.

As repeatedly emphasized in this space, the atmosphere surrounding consolidated airline facilities is not conducive to industry mergers. The free play of economic forces is not permitted to operate in the regulated air transport industry. This environment removes a compelling force or a real incentive to desirable combinations.

Refrains can always be taken at the provisions of the Civil Aeronautics Act of 1935 which certifies a permanent certificate carrier to sufficient mail pay, under stated conditions, to make pay, permit and future questions while.

Moreover, the economic climate of the industry would be most directly concerned with any or all of the above possibilities and may be expected to

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Security & Ultimate Confusion

For four years on this page *AVIATION WEEK* has been reporting and displaying the steady trend toward more and more restriction of U. S. Government news. Always, the abhor for censorship has been "national security."

All loyal Americans, including us, believe in helping maintain national security. But we have pointed out unreasonable examples of unnecessary, capricious, overzealous withholding of facts from the American people. And we expect to continue doing so.

The most recent case of pronouncement, counter-pronouncement, amplification and interpretation on the subject of what the President thinks can be safely printed and what cannot evokes any of the experiences of Alice in Wonderland. But these weird excursions are neither funny nor ingenious products of the keen, creative mind of a Carroll. These most recent ridiculous goings on were set in motion by the President of these United States.

No other incident or series of incidents nurtures more vividly the unbelievable confusion and ambiguity in at least one high place in Washington. So does it reflect the distorted attitude toward the press and the strange concept of public information.

The furore began with an executive order released by the President Sept. 24. In announcing it, Mr. Truman claimed the American people "have a fundamental right to information about their government, and there is no element of censorship, either direct or indirect, in this order."

But then he asserted that the purpose of the order was to permit every agency in the Executive Branch to clamp security classifications on any material it organizes which it deems to be "security information," material the disclosure of which "would or could harm, tend to injure, or otherwise threaten the security of the nation." He urged agencies not to classify data unless "necessary," but he left the way open for any civil service underling without previous experience in classification to slap a restriction on any paper whatsoever.

As the Washington Post said so well, the so-called security agencies—which formerly alone classified materials—these shared their classification powers reluctantly—as, for instance, in the State Department's putting a "restricted" stamp on a catalogue of names and

hotel addresses of the delegates at the Japanese Peace Treaty Conference in San Francisco. The Post said further that "the new security agencies . . . would be likely to abuse the power conferred on them by the President even more gravely."

In a press conference later, the President defended his order in the usual manner and because so eloquently enmeshed in the subject that at one time he was claiming that "patriotic publishers" should not even publish material that his own official government spokesmen had released. It was not long after the conference that the President's press secretary issued a statement to "clarify" Mr. Truman's views on security information.

"Mr. Short's 'clarification' quite reversed the trend and much of the rest of Mr. Truman's stern lecture . . . and it supplied no rule of thumb whereby any bystander responsible and qualified officials can be distinguished from those who are not," the New York Times declared, under the by-line of its chief Washington correspondent, Arthur Krock.

"Mr. Truman's tongue-lashing . . . is very difficult to explain or even understand," Mr. Krock said. He referred to the President's "new and bizarre concept of the duty of the press," (that it act as its own conscience and not act automatically upon approval of official government statements).

The only light ray as optimistic as yet now is the hope that finally the press and public have been alerted to positive and united action that will force this administration to back-track from its underhanded executive order.

Freedom of information has been nibbled at since the Roosevelt era, but so unobtrusively and unperceptibly that it has failed to arouse more than sporadic cries from a relatively few worried observers. This domestic and almost unbelievable handling of the President's may be what we needed, after all, to make us all demand more information from our government and get it.

On our part, *AVIATION WEEK* will be watching the civilian aviation agencies closely for any untoward attempt to withhold legitimate, non-secret information under the new executive order after it goes into effect late this month. We shall report to you such instances with names, places and dates.

—Robert H. Wood

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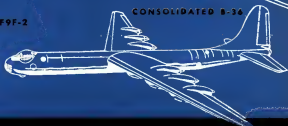
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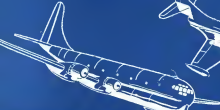
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